

A zoological revolution: rethinking our interactions with native fauna to increase the conservation options

Daniel Lunney¹ and Chris Dickman²

¹NSW National Parks and Wildlife Service, PO Box 1967, Hurstville 2220

²School of Biological Sciences and Institute of Wildlife Research, University of Sydney, NSW 2006

ABSTRACT

The objective of this forum was to assess revolutionary conservation proposals that aspire to reform current constraints on using native fauna as a replacement for the traditional European models of land use. Gordon Grigg outlines the history of the ideas that underpin this radical proposal. Mike Archer argues that eating our native fauna is a better conservation option than the current paradigm of an English agricultural landscape that excludes native fauna and is composed almost entirely of introduced plant and animal species. The trade-off for the retirement of sheep from much of the land is that we consume kangaroo and other native species in order to create a market for indigenous products. Mike Archer and Paul Hopwood present and defend another contentious thesis, namely that native mammals should become pets, and thus provide Australians with the opportunity to get to know their own fauna. This proposal has its critics in Karen Viggers and David Lindenmayer, who address a long list of serious matters concerning the keeping of native mammals as companions. Penny Figgis presents her concern that Archer has overlooked the fundamental value of national parks as repositories of biodiversity in his grand vision of a wild landscape. Harry Recher's position is the most challenging. He remains concerned that these proposals do not address the fundamental problems of the land degradation crisis.

Introduction

Welcome to a forum that debates the necessity for a zoological revolution that some Australians now deem to be imperative to stem the ever-mounting loss of our native wildlife. The twin objectives of the Royal Zoological Society of NSW are to enhance the science of zoology and to conserve native fauna and their habitats. Convened in this spirit, this forum, entitled "A Zoological Revolution", sought to test some controversial ideas which stem from the subtitle of this forum, namely "the use of native fauna to assist in its own survival". The objective was to provide a critical assessment of these revolutionary conservation options that aspire to reform our outlook by utilising native fauna as a replacement for the traditional European model of land use that has led to the loss of so much of our biodiversity in the last 200 years.

There is an oxymoron, a seeming self-contradiction, in the phrase "revolutionary conservation". The revolution is in the thinking

about how to live with our native fauna to give Australians an incentive for conserving it, the long-term aims being to conserve the fauna and the habitats on which they depend, and to keep our natural ecosystems free of toxins, feral species and soil degradation. If this exercise were only a matter of preserving a small breeding population of a modest number of vertebrate species, then a zoo upgrade would suffice. This is not, however, the intent, although a small number of species, such as the quolls, Tasmanian tiger, koala and flying-fox, inevitably serve as icons for the wealth of Australia's natural biodiversity. The intent is to conserve our natural biological treasurehouse with its full range of biota by shifting our thinking to a holistic approach (rather than a piecemeal approach, such as focusing just on threatened species or particular land tenures) and conserving the landscape by consuming it on an ecologically sustainable basis or by sheltering some species as pets.

In his enlightened *Handbook for the Positive Revolution*, Edward de Bono (1991) said he was not writing for those who want to go their own way or do their own thing or for those who are disposed to be negative; he wrote his book, he says, for those willing to use thinking skills to be positive, and for those who recognise that they are inseparably part of the world in which they live. What was particularly attractive in his little handbook was the advocacy of humour which, he acknowledged, is not a traditional tool of the revolutionary. What humour tells us, writes de Bono, is that although the mind works in patterns, these patterns can be switched, often by humour. Humour is certainly something that is needed in this era of information overload, including the wealth of detail we have about environmental deterioration. The recollection of de Bono's words should bring a smile to your face as you watch your neighbour's quoll stalk your pet bandicoot.

Information is an essential component in determining the best way to achieve a conservation target and to design a better solution, but it does not generate revolutions in itself, nor even show the way forward. The key to effective conservation action lies in the power of perception, the ability to challenge old values and to create and establish new ones. Other principles, such as the need to be constructive and respectful and to be a contributor, are essential in any revolution, but it is perception that is the first step in advocating and effecting change. Perception, says de Bono, is how the brain processes information and thus determines how we see the world. Thus it is perception we are principally addressing in this forum, where the tools of information, logic and education are used to advance good ideas, discard the bad, and to propose initiatives in a positive way that involves everyone.

Why we need a zoological revolution

Let us consider some of the evidence for the need for a zoological revolution. In 1992 there was an audit of the vertebrate fauna of NSW. It was the first ever review and it concluded with a number of quite sobering facts. Three items in particular should be mentioned.

Firstly, 233 (26%) of the State's 883 species were listed officially as threatened. Secondly, there were another 113 species out of this total that at least one expert who had been involved in the assessment process considered should be listed as

threatened. Thirdly, mammals were by far the worst affected group. Twenty-seven of the 130 then-known species of mammals in NSW (two more species have since been found in the far west of the State and another in the far north east) had become extinct in the State, and 57% of the remaining species were identified as threatened. This work has been published (e.g. Lunney *et al.* 2000a) and a major conservation effort across the state is now directed towards threatened species.

More importantly, the species that were listed as threatened are symptomatic of broader problems, namely the loss of native habitats, the degradation of ecosystems and the introduction of pests. One way of addressing the issue – through the legislation (such as the *Threatened Species Conservation Act 1995* in NSW) – has been to draw up recovery plans. These are prepared individually for each species, yet for all their value it is easy to argue that they are, on their own, insufficient to address the problem. That such a broad swathe of our native fauna is at risk, or extinct, surely points to immense, underlying problems that we appear not to be addressing.

It may be that these underlying problems stem from somewhat romanticised notions that prevailed in England when Australia was first settled, and that the early colonists were hoping for “a land of milk and honey”. At issue is the way in which the landscape was treated, how everything was made to replicate English life and conditions in Australia, from what we eat, to the way we use it, to what we call the seasons – spring, summer, autumn and winter – to use the phrasing that is English, but is inappropriate for the Australian landscape. Let us pause to consider this “milk and honey image”. When Moses left ancient Egypt and led his followers to the promised land of milk and honey, he was conjuring up a life style that moved up the food chain from a grain-based diet. Milk and honey are animal products. His actions suggest an intention to adapt the early Egyptian agricultural successes of the Nile banks to a rangeland existence on the Sinai peninsula, with nomadic herds, presumably of goats and sheep, and honey collected opportunistically. This exodus was part of the early spread of an agricultural existence that was set to expand because of increasing technology, trade and an ability to move when lands became depleted or overpopulated. Similarly, the settlement of Australia by Europeans in the nineteenth century was propelled by a grander, English version of the Biblical exodus. However, in Australia, the milk

has come at the environmental cost of coastal valleys cleared of native habitat and converted to dairy farms within a century (that is, by the outbreak of World War 1) (e.g. Lunney and Leary 1988, Lunney and Moon 1997). The production of honey from imported bees has also brought its environmental costs to native bee populations and native flora pollination potential (Schwarz and Hogendoorn 1999). Moving onto the plains west of the Divide in the first half of the nineteenth century, sheep reached the Western Division by 1841 and caused an environmental calamity that ranks among the greatest of modern mammal extinction episodes, with 24 species rendered extinct by about 1900, and the landscape so damaged that it brought on a Royal Commission in 1901 (Lunney 2001, Noble 2001, Quinn 2001). The reason the sheep in the west were so damaging was the huge increase in numbers generated by the export wool trade. It was the London markets that drove profits and thus sheep numbers irrespective of any notions of the sustainability of the arid lands of Australia, with their erratic rainfall patterns and erodible soils.

Our dairy farmers are now groaning under the impact of milk deregulation, which is forcing many off the land and, like the degraded lands of the west which cannot be repaired from the proceeds of wool profits collected in the 19th century, the coastal valleys cannot draw on earlier dairy profits to effect their restoration. It is today's generation that is footing the bill for these earlier agricultural policies. There is no point in attaching blame to the pastoralists, but it is fair to point out that the degradation of the native landscape in NSW was a 19th century event that stretched from the coast to the arid west, and that only in the last 30 years has there been a major realisation of the consequences of an unrestrained dream of milk and honey based on an imported model. Of course, many people had seen it earlier, and seen it vividly, as described in the evidence to the Royal Commission of 1901 on the Western Lands and during the creation of the NSW Soil Conservation Service in 1938, both of which showed a commitment to prevent further losses, although there was no change to the agricultural paradigm on which our society was built.

We have increased our efforts to protect threatened vertebrate species, but there are also many plants that have been listed, as well as endangered populations and ecological communities, not to mention endangered invertebrates and other biota that are being listed

for the first time. It is arguable that the emphasis on threatened species may relegate other ways of identifying and tackling broad-scale problems to a lower priority and demote them to a spot where they divert attention from the underlying problems. It is these problems that this forum has attempted to address with a revolutionary zeal that manifests itself as novel solutions deserving of a space where they can be examined and tested.

Radical conservationists and their critics

We need urgently to consider the “use it or lose it” thesis if we are to develop more effective means of conserving our natural heritage than have been employed in the past. Several speakers addressed this issue from their unique perspectives.

Gordon Grigg was one of the first scientists to promote the controversial idea of harvesting kangaroos to achieve a greater conservation outcome for our damaged rangelands. That was at a one-day Royal Zoological Society forum on 14 May 1988 that packed the auditorium (Lunney and Grigg 1988). Grigg's contribution has been much cited subsequently because his case was well stated; it foreshadowed the difficulties in gaining public acceptance of the idea and dealt in depth with such vital issues as consumer and kangaroo health and land and kangaroo management. Today we enjoy some of the fruits of Grigg's proposal in being able to order kangaroo at restaurants and buy the meat at butchers in NSW. The idea seems to be slowly gaining acceptance, arguably too slowly. In this forum, Grigg outlines the history of ideas underpinning the commercial use of kangaroos for conservation. His thesis, and the steady stream of positive results arising from his research, his thinking and his writing, have arguably been the most important single contribution to this debate in Australia. His views are thoroughly ecological, are focused on the land itself, and are based on a deep knowledge of kangaroo biology. Most importantly, his ideas incorporate the landholder in the equation of the gains of kangaroo harvesting. His is an unselfish thesis that his grandchildren will thank him for.

Mike Archer and Paul Hopwood presented and defended other controversial ideas. Both are experienced biologists with a contentious “pet” thesis that has already begun to engender much discussion. Mike Archer wants to utilise wildlife as food and as pets to conserve our fauna as well as the entirety of our biodiversity including animals, plants, invertebrates and the genetic variation they carry. He also argues that our

fauna need space to evolve, so he opposes reserves the size of a pocket-handkerchief, is impatient with tokenism towards land conservation, and will not be satisfied by modest targets. Eating our native fauna, he says, is a better proposition to the current paradigm of an English agricultural landscape, which is eroding or salting up in front of our eyes as every television viewer knows. Archer extends the concept of a national park to cover the entire landscape, so that fauna can spread over the land and evolve. Major conservation benefits would follow from the retirement of sheep over much of the land, but the trade-off is that we must begin to consume kangaroo and develop a market for it.

Grigg, Archer and Hopwood stirred their ideas into the evolutionary cauldron of public debate and uncovered strong forces in this forum to support the survival chances of their arguments. However, critics at the forum challenged these radical proposals. Viggers and Lindenmayer confront the Archer and Hopwood initiatives by addressing a long list of serious matters concerning the keeping of native mammals as companions.

Figgis presents her apprehension that Archer has overlooked the fundamental value of national parks or, if he does acknowledge their positive worth, she warns that his comments on their limitations have been construed by the anti-conservation lobby to mean that they are of little value in the overall equation of conserving biodiversity in Australia. Elsewhere, one of us (Lunney 1998) has argued that scientists generally have not given the whole idea of national parks and nature reserves the support they deserve. Margules and Pressey (2000) have also added their weight to the debate and support the concept of reserves. Figgis is far from being a lone voice and, as vice-president of the Australian Conservation Foundation (ACF), she represents a constituency that spreads to all corners of the nation. Nevertheless, there needs to be more vocal supporters, especially among the scientific community.

Recher is one of those rare iconoclastic voices who, after a third of a century of listening to both the problems of and solutions for nature conservation, can comment fearlessly on whether we are promoting sound new ideas or, indeed, whether we need a revolution at all. Recher's position is the most challenging. He does not really cavil with the propositions that native animals should become pets or human companions (Archer, Hopwood, Braithwaite),

that Australians should develop a taste and a market for wild foods, particularly kangaroo (Grigg and Archer), that wildlife ecotourism should be developed (Braithwaite) or that the search for new chemicals and antibiotics, especially in marine invertebrates, should be pursued (Benkendorff), but he remains concerned that these proposals may not be addressing the basic problem, namely the development/consumer economic model that is at the root of the land degradation crisis. A human population that is growing both in size and demands on the environment is already demonstrably unsustainable.

Quolls instead of cats, kangaroos instead of beef or lamb, new antibiotics from the sea near Wollongong and native wildlife safaris are fringe concerns from Recher's perspective. Fewer people consuming less, and an immediate cessation of land clearing and other broad-scale destructive uses of the landscape, are the only answers. Recher despairs that our current crop of politicians miss the point, but he recognises that they only reflect society at large and it is society as a whole that has to rethink its resource-use outlook. Recher's basic solution is to be achieved through education. Like most people at this forum and those reading these pages, education has been one of the most liberating features of their lives. It has allowed people to escape from the trappings of the past. However, great skill will be required by the current and emerging generation to throw off the success formulae of the 20th century and rethink a future that is not only less demanding of the environment, but also restorative of the air, water, vegetation and fauna that are dependent upon it.

Recher has promulgated this view all his working life. He is supportive of new initiatives, and does eat kangaroo, but he reserves a special hostility for false conservation efforts. He is a strong supporter of national parks and nature reserves, but has a deep-seated aversion to the dedication of wilderness over existing parks and reserves when this leads to the throttling of research in these areas. Parks and reserves have many functions, he says, and fundamental among them is research. If governments and managers promote environmental objectives in parks that exclude researchers and their equipment such as tents, huts and marker posts, and regard their presence as a violation of pristine values, then they have unwittingly betrayed the national parks ideal. Recher believes that a wilderness management regime, which inhibits research and education to

the extent that only passive observation is allowed, will only encourage the forces arraigned against national parks and nature reserves. Recher is one of the few skilled researchers and teachers to speak out on this issue.

We might look back on this forum and say this was the period when Archer, Grigg, Hopwood, Braithwaite and Benkendorff were burnt at the stake of public indignation because they suggested that we abandon the imported fauna from another land – cows, sheep, cats and dogs and antibiotics – and try to live off the milk and honey of native Australia. In this context it is worthwhile considering the use by Aboriginal people of the native fauna. In discussions of the use of native wildlife, indigenous use offers a vital if complex perspective, partly because of legal considerations, partly because of the rarity of some species, such as the Dugong *Dugong dugon* and, controversially, because Aboriginal people now use rifles and 4WD vehicles (e.g. Grigg *et al.* 1995). In these circumstances, is a blanket ban by European law appropriate? There is a long history of Aboriginal

dependence on these fauna, and the European land-use ethic has robbed the Aboriginal people of their food as well as other elements of cultural identity. A closer look at Aboriginal practices can show a way forward for European society with respect to using native wildlife.

The influence of the media and advertising

An appalling land-use ethic can often be found in the media where its effects are all the more insidious for being subliminal. For example, in the *Sydney Morning Herald* (Monday, 27 March 2000) there was an advertisement for the unbreakable Toyota Hilux which emphasised the vehicle's extra pulling power. The small print said, "If you want a truck with a lot more grunt, look no further than your Hilux" (Fig. 1). A critical examination of the photograph of the Hilux in context is most revealing. The Hilux was pulling out the last remaining stumps in a grassy paddock. The stumps are, of course, the last vestige of native habitat in what would have originally been, judging from the size of the stumps, a forest. So, there was a forest, cleared, turned to grass, and now the last bit of



Fig. 1. This graphic half-page advertisement in the *Sydney Morning Herald* on 27 March 2000 illustrates the application of 21st century technology to 19th century thinking. Here stumps are being grubbed from a grassy paddock, and with their disappearance go the last the remnants of what would have been a forest in 1788. It will take a revolution to prevent the last vestiges of our native faunal habitats being progressively modified and cleared. If Australia's rich zoological heritage is to survive, there needs to be a much sharper appreciation of the impact of our agricultural enterprises on our fauna.

habitat was being pulled out with the extra grunt made available by sophisticated engineering technology. An appalling land-use ethic is implied here. The ad seems to support the exploitation of the land until all its native values have gone, including the only remaining stump. If the wool or cattle or dairy industry were to collapse or were drastically reduced in such a landscape, the restoration options for the land would have been lost, and its fauna rendered extinct. The Hilux is not the problem since it might well be the vehicle of choice in any land restoration project. The real problem is the shocking maltreatment of the land by someone with the temporary power to do so. This ethic has been the root cause of all our land management problems, from salination of the inland agricultural lands to the clearing of littoral rainforest for beach sand mining. Archer, Benkendorff, Braithwaite, Clancy, Dickman, Figgis, Grigg, Harris, Hopwood, Hutchings, Lindenmayer, Lunney, Recher and Viggers may have seen the best of our fading faunal wealth, with younger researchers just catching glimpses of the last native frog, lizard, bird or insect escaping from the last stump in the grassy paddock or its marine equivalent.

The greatest problem facing the Australian fauna is the clearing of native habitat (or native vegetation). (Since the task of the conservation of native vegetation is as much a zoological exercise as a botanical one, we hasten to urge greater cooperation between the disciplines to maximise the benefits across the landscape.) What we are doing with the extra technological power (as in the Hilux ad) is destroying what remains of the native vegetation even though this does not seem to serve any immediate economic purpose, unless it is to flatten the land for laser ploughing. This suggests that native landscapes are regarded as worthless unless "improved" for European-style agricultural production. While one can be personally sympathetic to the individuals who brought this land ethic to Australia, as one of us is about his farmer grandfather from Lincolnshire (Lunney 1999), the destructive force of such an ethic is evident throughout NSW. The extra grunt of the Hilux has merely given the farmer/land manager that extra capacity to be destructive. This image symbolises the application of 21st century technology to 19th century thinking. It is a harmful association that will take a revolution to uncouple, but disentangle them we must if we are to save any of our remaining fauna.

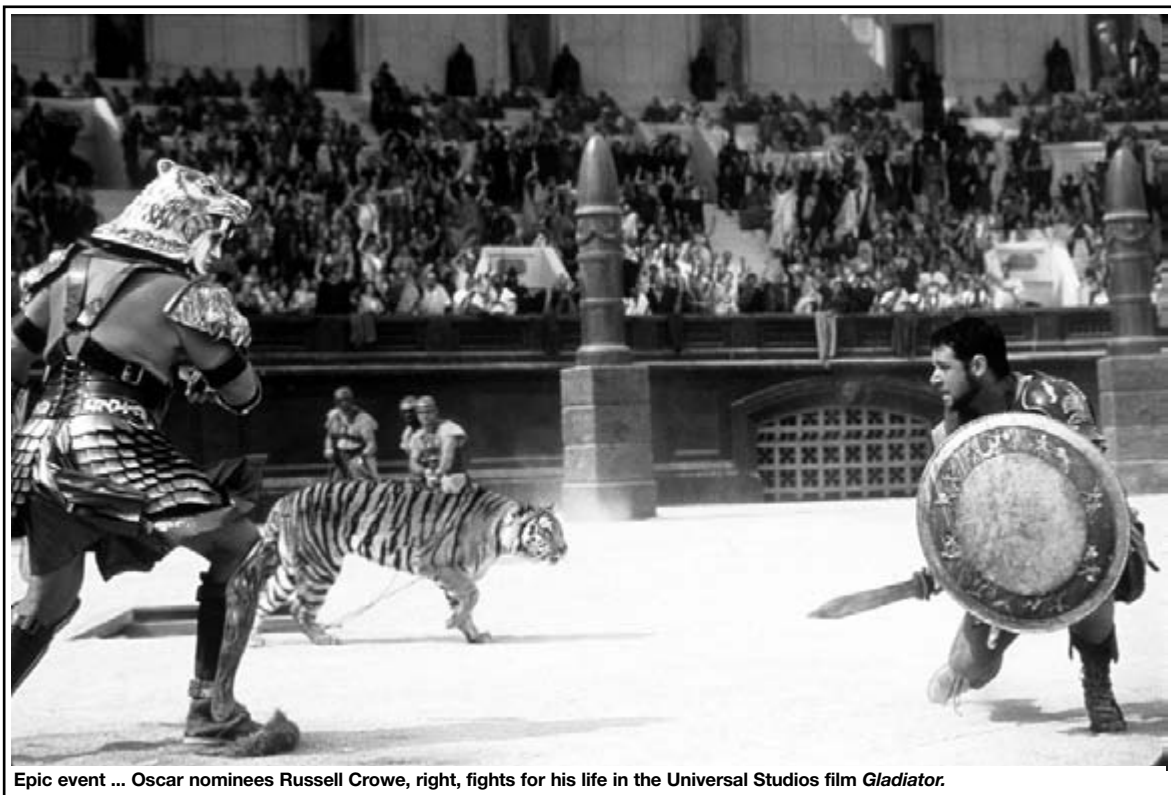


Fig. 2. Again, on 27 March 2000, the *Sydney Morning Herald* provided the zoologically-minded with a rich image. In this epic battle the tiger will die. Every tiger is now at the point of the 21st century sword: the gun, the poachers' snare, chain saws and farm machinery that assure that tiger populations will die from the relentless loss of habitat. In modern terms the tiger is an internationally-recognised endangered species. What is needed is an ability to see this confrontation in reverse, i.e a need to conserve and restore rather than fear and kill this magnificent creature. It will take a zoological revolution to do so. (Photograph by AP reproduced with permission)

On the same day, 27 March 2000, there was an article in the *Sydney Morning Herald* about Russell Crowe winning an Oscar for the blockbuster movie "Gladiator". In the accompanying photo he is fighting a tiger with his terrible Roman sword (Fig. 2). Here we have an actor of international fame who is widely depicted as slaying what has become, since Roman times, an endangered species. It is a shocking image. Go further, and look at the zoology. Was there a tiger in ancient Rome? Crowe probably should be fighting a lion since the nearest tiger was on the Indian subcontinent. With both the zoology and the conservation biology wrong, an atonement is required. What about 50% of the film's profits going to tiger conservation?

Sadly, the same level of zoological fantasy is at work at the Royal Botanic Gardens in Sydney, at least as headline writers in the media see it. Scientists are concerned about the conservation of the Grey-headed Flying-fox *Pteropus poliocephalus* as it is an animal species in rapid decline (e.g. Eby *et al.* 1999) and it has been identified as qualifying for national listing as vulnerable (Duncan *et al.* 1999). It became a candidate for consideration as threatened fauna in NSW in late 1997 (batcall.csu.edu.au/batcall/abs/home.htm) and was finally listed as a vulnerable species on 4 May 2001, yet here we have a headline that reads, "Gardens slaughter as mighty newcomer rips into bat pests" (*Sydney Morning Herald* 9 May 2000, Fig. 3). Every time the media calls a species a "pest", usually meaning a pest to a sector of the agricultural community, this hinders its potential for being considered for what it is – a threatened species in its own right. In this article people express excitement at the prospect of a Powerful Owl *Ninox strenua* eating the "pest" Grey-headed

Fig. 3. "Who will be the next snack?" That is the question posed under the photo of the flying-foxes in this article in the *Sydney Morning Herald* on 9 May 2000. Witty, yes, but there is no mention that this species, the Grey-headed Flying-fox *Pteropus poliocephalus* was under consideration at the time for listing as a threatened species in NSW, a status it was granted on 4 May 2001. A 'pest' is only one viewpoint. There are others, and it may take a revolution for the zoological outlook to find an equal footing to match the long-standing concept of agricultural pests being society's pests. A new path is now needed. (Photographs and text reproduced with permission)

TUESDAY, MAY 9, 2000 www.smh.com.au The Sydney Morning Herald 9

Gardens slaughter as mighty newcomer rips into bat pests



By JAMES WOODFORD
Environment Writer

A powerful owl, the mightiest of Australian night-time bird predators, has for the first time established itself in the heart of Sydney's CBD, looking out from all who disturb its privacy and feasting on an endless supply of fruit bats.

The bird has been at the Royal Botanic Gardens for nearly a week, astonishing staff, who have never before had such a visitor.

Gardens technical officer Ms Jane Bennett says the owl is the nation's largest owl. As she walked under a weeping lilly pilly last Tuesday near the gardens' kiosk she noticed a flurry of avian angst in the boughs above – currawongs and noisy miners were attempting to scare the half-metre-tall owl out of their territory.

Yesterday, the raptor has been seen roosting among palm trees, a brown pine and yesterday was keeping a low profile in a fig.

Gardens senior ecologist Mr John Benson said – pointing to fruit bats upside down and apparently oblivious to the

danger they were in – it was clear why the owl had detoured from the wilder parts of the Sydney Basin to a spot under the shadow of the skyscrapers.

Powerful owls (*Ninox strenua*) are capable of killing just about anything able to fly and eat. Red-tailed and white-bellied are its favourite, though it has been known to consume the occasional magpie, unlucky enough to find itself in the way of its oversized talons.

It is also known that they eat fruit bats and senesces were not surprised that now the gardens' pest management had attracted a powerful owl.

"It's got food all around it," said Mr Benson. "It's like being surrounded by Christmas pudding or like having a tiger with all these little gazelles all around it."

The fruit bats have been an onerous pest for the staff at the gardens because they are in such large numbers that they damage the trees in which they rest and feed.

Mr Benson was not the first gardens staff member heard welcoming the arrival of the powerful owl.

"What we need is another 20 of them," he said.

He also said the presence of the bird highlighted the importance of planting native trees in the Sydney area because the powerful owl had chosen to set up in an old, threatened refuge that is primarily found on the Central Coast.

An owl expert, Dr Rod Kavanagh, who is senior research scientist at NSW State Forests, said it was a significant powerful owl record – the closest to the CBD that he knew of.

"They're intruding into the Sydney CBD," he said.

Kavanagh said "It looks as though some new spots are being colonised."

Other recorded sightings close to the city include Vaucluse, Manly Dam, Malabar and Kurnell, although they are usually more common in the forested parts of the northern shore.

The nesting season for powerful owls was approaching and Dr Kavanagh said it would be interesting to see whether the owl spotted yesterday found a partner and set up a permanent home at the gardens.



Photographs by RICK S EVENS

Flying-fox in the Royal Botanic Gardens. The Powerful Owl is a great animal, a magnificent predator, but this headline makes for farcical conservation biology. The sympathetic and intelligent environment writing of a young journalist, James Woodford, is misrepresented by a conventional headline writer who regards wildlife as pests.

Regrettably, ignorance of our natural heritage is to be found nearly everywhere you look. For example, on the corner of Liberty Street and Railway Avenue, Stanmore, NSW (near the University of Sydney) in May 2000, an advertisement for the “truly wicked five-door Honda” glared down at us for even thinking of a forum on a zoological revolution (Fig. 4). This huge billboard depicts a modern Honda 4WD vehicle in front of an old sandstone house with bats circling around the chimney in the top corner of the photo. The bats represent an association with the devil, which stands as a carved stone gargoyle in the foreground. Bats here are the companions of the “truly wicked”. This is horrendous advertising. In NSW, 20 of the

37 species of bats are officially threatened, but in the ad we see declining species portrayed as evil creatures. Not only is the implication of the ad disturbing from a conservation point of view, but the zoology is wrong. The bats in question look like flying-foxes. These large fruit bats are not the blood-sucking bats of European mythology that have given all small insectivorous bats such a stigma. On the contrary, these large flying-foxes are fruit- and nectar-eaters and they are fading in NSW (Eby *et al.* 1999), with two species, the Black Flying-fox *Pteropus alecto* and the Grey-headed Flying-fox listed as threatened. This terrible advertisement was put up shortly after the magnificent exhibition on bats closed at the Australian Museum. By comparison with the space and reach of the Honda advertisement, the Australian Museum exhibition had but a minor impact. Our dislike of the advertisement does not blight our perception of this Honda model, but it does show just how difficult it is to turn community values away from the old European outlook that has been so inappropriate for Australian landscapes, seasons and fauna.

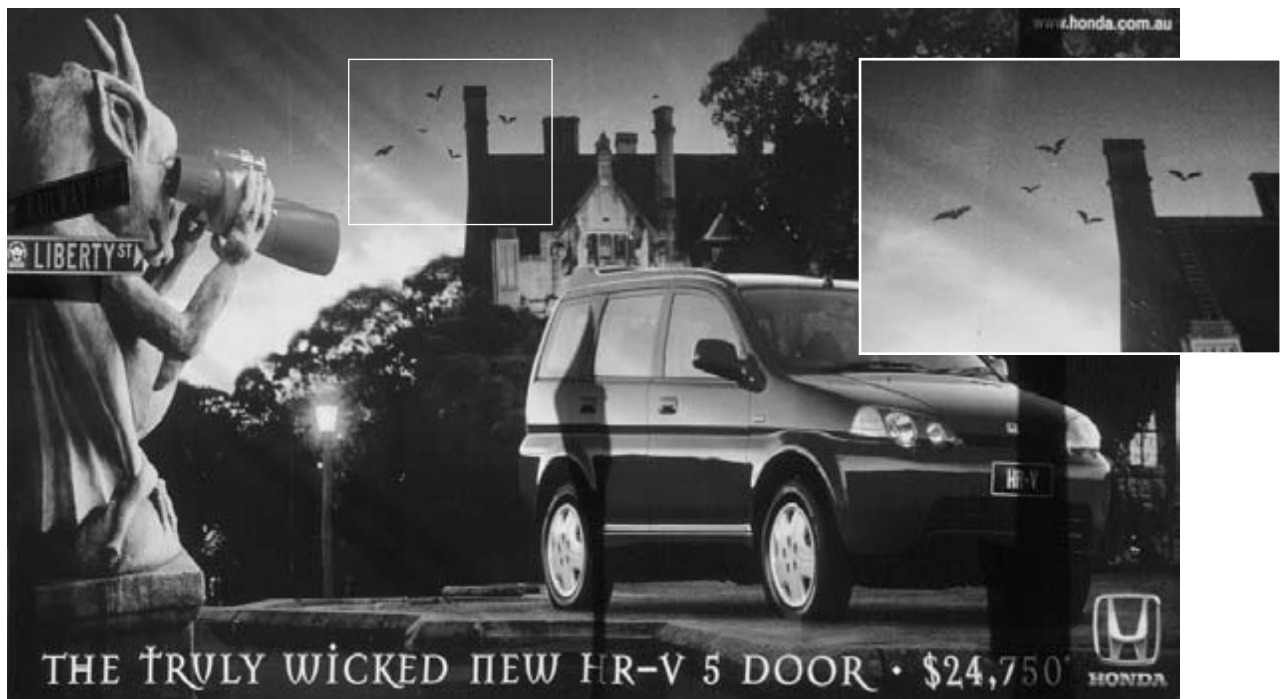


Fig. 4. The gargoyle is watching the “truly wicked” new Honda. To give the picture an air of verisimilitude, the symbols of wickedness abound. The bats around the chimney are shown more clearly in the inset, which was a close-up of this billboard advertisement in Stanmore, NSW. The classification of ‘wicked’ is a precursor to legitimising the destruction of bats, not to mention neglect of this major Order of Australian mammals. “Liberty” as the street name in the foreground is a delightful contrast to withdrawal of liberty for the bats. About one quarter of the native mammal fauna of Australia are bats. Such advertisements trade on European myths that had no foundation in the first place and are now being applied to our Australian fauna. It demonstrates that there will need to a revolution to appreciate Australian bats, their value and the need to study them and prepare plans for their conservation. (Photo by Daniel Lunney.)

The conservation challenge

During the forum Harry Recher warned participants of the dimensions of the conservation challenge in the future: “The size of the football field we are playing on is not one that is modest in size; the goalposts are small and receding and we have got to play, in fact, a very large game; and that is what the debate is about”.

One of the greatest challenges of conservation science is in communicating ideas to the general public through the media and through educational programs. Some journalists from the press are picking up on the ideas. David Dale, for example, wrote an entertaining piece titled “Have Skippy – and eat him too” (*Sydney Morning Herald*, 10 October 1999). Schools, however, are not educating the young in wildlife and conservation issues as Mike Archer discovered when confronted by the ignorance of a sample of children who did not know one native animal from another (*Science in the Pub* segment on the ABC Science Show, May 2000, and *Sydney Morning Herald* article “Kids don’t know our animals” by Daniel Dasey on 14 May 2000).

Consider that there are 891 vertebrates currently recognised as protected native fauna in New South Wales (Lunney *et al.* 2000a). That is only about the same number of students as in most high schools. Most students get to know almost all of the faces of their fellow students and even most of their names during the period of schooling, and after 20-30 years can still remember many classmates. Why is it that we cannot similarly name our native mammals? Or any of the other vertebrate groups?

There are three reasons for this. Firstly, there is a simple lack of acquaintance with the appearance of each species. This could be overcome with a gallery of pictures around a school, with the common and scientific names of each animal listed beneath. This display could be presented thematically, such as by habitat, taxonomic association, size, colour, movement and diet type and could also include conservation status, value as Aboriginal food and use as icons, such as in the 2000 Olympics (Lunney *et al.* 2000b). The Museum and other fauna organisations could play an even bigger role here and present the fauna as a catalogue in book form or on the web as a parade that puts names to faces to familiarise the Australian public with their native fauna. Secondly, the inhibitions on approaching or touching native fauna make them more remote

and less likely to be noticed unless they are huge, like a whale, or strikingly different, like a koala or a platypus. A strong case for a closer association between humans and native wildlife is made by Archer and Hopwood in this forum, although Viggers and Lindenmayer have much to say on the “pet” approach. Thirdly, the irrelevance of native fauna to our daily lives maintains their status as zoological oddities. If they were food items, their relevance would rise sharply and the issues would then be about their ecologically sustainable management and conservation. The essence of the argument is that by placing a value on native wildlife that gives a local return, then the local population will, in turn, help conserve these now-valuable species. It is also noted that an ecologically sustainable development (ESD) approach requires that habitat restoration be adopted as part of the package in developing the commercial use of native fauna.

A long history of overuse of the land, timber, native wildlife, fish stocks and marine mammals is a poor foundation for planning a sustainable future. The temptation of short-term gains combined with environmental ignorance, the pressure to export and the unwillingness of governments to regulate suggest that a revolution in perspective is just about impossible. If the same old attitudes to natural resources continue, it would be counter-productive to pursue the consumption of native fauna. Here we are at a turning point. With the Australian landscape deteriorating on a massive scale and entire river basins in crisis, there is a new willingness to look beyond remedial action that still leaves the old environmental threats intact. Archer is challenging the agricultural basis for our existence, principally the imported agriculture with its half a dozen stock species. Any attempts to continue to live solely within that framework will spell disaster to our native fauna, to the land itself and eventually to our culture.

Conclusion

While we were preparing for this forum a short article appeared in the *Sydney Morning Herald* (13 October 1999) with the title: “Sixth billionth baby is born into a world of difficulty”. The article reported Kofi Anan, Secretary-General to the UN, welcoming the sixth billionth baby into the world, and stated that the baby would need lots of luck in a world where half the world population, or 3 billion people, get less protein in their diet than the average American house cat. The brief article also

noted that by the time the reader had finished the article, the next baby will have been born. This population overload is what is underpinning so much of the massive and continuing loss of biodiversity. Harry Recher, among others, has been pushing this difficult line since the early 1970s, and it is continually unpopular. One of the side effects of the overuse of resources is the growing list of threatened fauna in NSW. It is a symptom of the problem, and not the centerpiece, so it is but one measure of the impact of overpopulation combined with more powerful technology and a non-ecological approach to land use. Paul Ehrlich has often said that no environmental rescue program can ultimately succeed unless we also deal with the overpopulation issue. That is true, but it may be that dealing with the other issues, such as loss of wildlife, or contemplating a solution such as the commercial use of wildlife and the restoration of native habitats, brings home the point and forces the changes that lead to a sustainable population policy. That new perspective is the basis for this forum. Population policy is a contentious issue and it is easier for the public to show concern for threatened species. If we wait for a great population policy to appear, the threatened fauna may have become extinct and the now non-threatened may have slid onto the threatened lists.

In the *Good Weekend* (*Sydney Morning Herald* 8 April 2000), David Suzuki was reported as saying: "50 per cent of the birds and mammals will be gone before the end of this century". The year before, Harry Recher (1999) had predicted that 50 per cent of Australia's birds would be gone by the end of this century. There is a common recognition of the scale of the problem by those who confront it as scientists, but the time scale of 100 years down the track does make it sound irrelevant to most people. Everyone present at the forum will be dead by the end of this century, but the problems will not be dead, nor will the legacy of current inaction. What is more, we are largely ignorant of 52 per cent of our vertebrate fauna in NSW and do not know enough to be able to effectively classify them by conservation status (Lunney *et al.* 2000a). Worse still, by the time the RZS had published *The Other 99%* (Ponder and Lunney 1999), it was evident that the scale of ignorance of our biodiversity, and thus the size of the task to conserve it, had risen by many orders of magnitude. This is a difficult revolution indeed and it goes to the heart of our society's mainsprings. Now read on.

Acknowledgements

We are indebted to many colleagues for discussions over the decades, and to participants in this forum in particular for their boldness, their zoological skill and their willingness to listen,

argue and change. We are also indebted to Irina Dunn, Gordon Grigg and Harry Recher for their critical comments on this manuscript.

References

- de Bono, E. 1991. *Handbook for the Positive Revolution*. Viking, London.
- Duncan, A., Baker, G. B. and Montgomery, N. (eds) 1999. *The Action Plan for Australian Bats*. Environment Australia, Canberra.
- Eby, P., Richards, G., Collins, L. and Parry-Jones, K. 1999. The distribution, abundance and vulnerability to population reduction of a nomadic nectarivore, the Grey-headed Flying-fox *Pteropus poliocephalus* in New South Wales, during a period of resource concentration. *Australian Zoologist* 31:240-53.
- Grigg, G. C., Hale, P. T. and Lunney, D. (eds) 1995. *Conservation Through the Sustainable use of Wildlife*. Centre for Conservation Biology, University of Queensland, Brisbane.
- Lunney, D. 1998. The role of national parks and nature reserves as a field for science. Pp. 140-49 in *National parks: New Visions for a New Century*, edited by P. Prineas. Nature Conservation Council of NSW, Sydney.
- Lunney, D. 1999. A changing land-use ethic: the inheritance and the legacy. *Habitat* 27 (6):19.
- Lunney, D. 2001. Causes of the extinction of native mammals of the Western Division of New South Wales: an ecological interpretation of the nineteenth century historical record. *Rangeland Journal* 23:44-70.
- Lunney, D. and Grigg, G. (eds) 1988. *Kangaroo harvesting and the conservation of arid and semi-arid lands*. Special Edition of *Australian Zoologist* 24:121-93.
- Lunney, D., and Leary, T. 1988. The impact on native mammals of land-use changes and exotic species in the Bega District (New South Wales) since settlement. *Australian Journal of Ecology* 13:67-92.

- Lunney, D. and Moon, C., 1997.** Flying foxes and their camps in the remnant rainforests of northeastern New South Wales. Pp. 247-77 in *Australia's Ever Changing Forests III*, edited by J. Dargavel. CRES, Canberra.
- Lunney, D., Curtin, A. L., Ayers, D., Cogger, H. G., Dickman, C. R., Maitz, W., Law, B. and Fisher, D. 2000a.** The threatened and non-threatened native vertebrate fauna of New South Wales: status and ecological attributes. *Environmental and Heritage Monograph Series No. 4*. Pp. 1-132. National Parks and Wildlife Service (NSW), Hurstville.
- Lunney, D., Dawson, L. and Law, B. 2000b.** A fauna survey of the Sydney Olympics: the media profile and its symbolic significance. *Australian Zoologist* **31**:417-20.
- Margules, C. R. and Pressey, R. L. 2000.** Systematic conservation planning. *Nature* **405**:243-53.
- Noble, J. 2001.** Guest editorial to Special Issue, Centenary Symposium. *Rangeland Journal* **23**:3-4.
- Ponder, W. and Lunney, D. (eds) 1999.** *The Other 99%. The Conservation and Biodiversity of Invertebrates*. Pp. 1-460. Transactions of the Royal Zoological Society of NSW, Mosman.
- Quinn, M. 2001.** Rights to the rangelands: European contests of possession in the early 20th century. *Rangeland Journal* **23**:15-24.
- Recher, H. F. 1999.** The state of Australia's avifauna: a personal opinion and prediction for the new millennium. *Australian Zoologist* **31**:11-27.
- Schwarz, M.P. and Hogendoorn, K. 1999.** Biodiversity and conservation of Australian native bees. Pp. 388-93 in *The Other 99%. The Conservation and Biodiversity of Invertebrates*, edited by W. Ponder and D. Lunney. Transactions of the Royal Zoological Society of NSW, Mosman.